

SEVERE STORMS.

Tornadoes were relatively infrequent. Seven were reported, as follows:

Houghton, Mich., 10th: A small tornado passed within 10 miles of the station. No loss of life, but much damage to growing timber.

Greenville, S. C., 14th: Small tornado near town; slight property loss.

Staten Island, New York City, 16th: A small tornado "swept over the lower end of Staten Island and left a trail of destruction in its wake." Pictures in the *New York Evening Post*, June 26, 1920, show some of the frame buildings destroyed.

Charlotte, N. C., 20th: Tornado near town caused damage estimated at \$30,000. (See pp. 351-352, above.)

Peoria, Ill., 22d: Small tornado 5 miles north of station; no material damage.

Cheyenne, Wyo., 24th: Tornado near Hillsdale, about 18 miles distant from Cheyenne, unusual for that section, but without large damage. (See p. 352, above.)

Rapid City, S. Dak., 29th: Destructive tornado 5 miles west of city, but without large property loss.

A severe storm on June 8 was reported from North Dakota and Minnesota:

St. Paul, Minn., June 9: At least two persons were killed, thirty or more injured, and heavy property damage resulted from a severe wind and electrical storm which swept northern Minnesota and parts of eastern North Dakota last night, according to reports received here early to-day.

Several buildings, including a grain elevator, were destroyed and several persons hurt, but no one was killed.

Breckenridge, Minn., June 9: Fifteen persons were injured, seven seriously, when four coaches of Northern Pacific passenger train No. 156 were blown from the track last night near Foxholme. A score of others received minor hurts.

At Gardner, N. Dak., several cars of a Great Northern freight train were swept from the track and two members of the crew were injured, telegraph reports said.¹

On the afternoon of June 19 a thunderstorm with a severe squall swept across the region between Washington, D. C., and Rockville, Md. A child was killed in Chevy Chase by a falling tree. A great many trees, some exceeding even a foot in diameter, were broken off or uprooted.

¹ Washington Evening Star, June 9, 1920.

STORMS AND WARNINGS—WEATHER AND CROPS.

STORMS AND WEATHER WARNINGS.

By EDWARD H. BOWIE, Supervising Forecaster.

[Washington, July 23, 1920.]

Washington forecast district.—There were no unusual happenings in the Washington forecast district during the current month. Frost warnings were issued the morning of the 3d for upper Michigan.

Northeast storm warnings were ordered the morning of the 5th for the Atlantic coast at and between Block Island, R. I., and Portland, Me., at which time a secondary disturbance was developing over New Jersey. This disturbance gathered intensity during the 5th, and during the night of this day it caused strong easterly winds and gales off the eastern coast of New England. Storm warnings were not again ordered until the evening of the 15th, and then for western Lake Superior when a disturbance, central over Iowa, showed indications of an increase in intensity and an eastward movement. On the 16th, when the center of this disturbance was over northeastern Iowa, the display of warnings was extended to eastern Lake Superior, Lake Michigan, and northern Lake Huron. The disturbance passed eastward over the Great Lakes on the 16th and 17th, and it was attended by strong winds and moderate gales on these dates. This disturbance approached the north Atlantic coast during the night of the 17th, and the afternoon of that day northwest storm warnings were displayed at and between Cape Henry, Va., and Portland, Me. The highest winds reported on the Atlantic coast in connection with this storm were 48 miles per hour at Block Island and 46 miles per hour at Nantucket. On the evening of the 20th southwest storm warnings were displayed on Lakes Erie and Ontario, and southeast storm warnings on the Atlantic coast at and between Delaware Breakwater and Portland, Me. At this time a disturbance was central over northern Ohio, increasing in intensity and moving northeastward. It was unattended, however, by winds of gale force.

WARNINGS FROM OTHER DISTRICTS.

Chicago forecast district.—No general warnings of any kind were issued during the month.

Frost warnings, however, were sent to the Dakotas, Montana, Wyoming, and western Nebraska on the morning of the 1st, and these were verified over most of Wyoming and a portion of Montana. The temperature did not fall to a sufficiently low point for the occurrence of frost in the States farther east.

The cranberry marshes of Wisconsin were unusually free from frost during the month, June 3 being the only day upon which critical temperatures occurred. Frost was reported on that morning from three of the four cranberry marsh stations. The minimum temperature in the bogs ranged from 28° to 30°. Warnings were telegraphed to the growers the previous day, June 2, at 3 p. m.

From time to time forecasts were made in a general way of important changes in temperature, and were well verified. These were published in the daily weather map issued at the Chicago station and also in the Corn and Wheat Region bulletin published at Chicago, and included in the summaries telegraphed daily to the various corn and wheat region centers.—H. J. Cox.

New Orleans Forecast District.—There were no noteworthy departures from normal June weather during the month just ended. No storm warnings were issued or needed. Small craft warnings were displayed on the Texas Coast on the 19th.—R. A. Dyke.

Denver Forecast District.—No important storms crossed the district during the month, and no frost or freezing temperature warnings were issued, except for high districts in Utah on one date.

Fire-weather warnings were issued on a few dates for the greater part of the district. The highest velocities reported were 48 miles from the SW. at Salt Lake City and 48 miles from the S. at Modena on the 10th. Advices of fresh to strong westerly winds were issued for the greater part of the district, including Utah, on the 9th.—Frederick W. Brist.

San Francisco Forest District.—Small-craft warnings were displayed on the 6th, 10th, 22d, and 26th at different

seaports along the coast and they were generally verified. Warnings for heavy frost were sent to southeastern Idaho and northern Nevada on the 1st, which were verified in southeastern Idaho, but not in northern Nevada; and warnings of light frost were issued for

eastern Oregon on the 5th and 23d, and both were verified. Fire-weather warnings were issued for California on the 1st and 24th and for northern California on the 18th. These were justified and it is believed did much good.—*E. A. Beals.*

FLOODS DURING JUNE, 1920.

By ALFRED J. HENRY, Meteorologist.

At the close of May the Mississippi below Arkansas City, Ark., the Red, Ouachita and Atchafalaya of Louisiana, the Tallahatchie of Mississippi, the White of Arkansas, the Rio Grande in New Mexico, the lower Trinity of Texas and a few others were in flood. These streams passed below the flood stage during the month (see Table I).

A report on the Mississippi flood in the New Orleans district will be found below; see also this Review, p. 366.

The snow flood in the Rio Grande was unusually severe in New Mexico between Albuquerque and Socorro. The Santa Fe Railroad, which parallels the river in this section, suffered numerous washouts and other interruption to traffic. Considerable damage was also done by overflow water at various places in the stretch above mentioned. Floods also prevailed in the San Juan basin in northwestern New Mexico, and in other tributaries of the Colorado in western Colorado. The crest of the flood on the Colorado passed Yuma, Ariz., on the 8th at a stage of 30.5 feet.

The annual rise in the Columbia, which is also due to melting snow, was one of the least in many years by reason of deficient snowfall.

Torrential rains in central Montana on the 5th caused a flood wave of water from the adjacent canyons to descend upon Lewistown, Fergus County, on the evening and night of the 5th. Loss to business properties, residences, and railroads in the city will reach close to \$150,000.

FLOODS IN THE MISSISSIPPI RIVER AND TRIBUTARIES BELOW VICKSBURG MISS., EXCEPT THE UPPER RED RIVER.

The flood in the lower Mississippi River, while it has not equaled previous floods in volume, has been of longer duration than any flood since 1908.

Number of days above present flood stage.

Station.	Year.					Flood stage.
	1903	1908	1912	1913	1920	
Natchez.....	54	104	63	37	68	Feet. 46
Baton Rouge.....	65	111	69	41	74	35
Donaldsonville.....	66	107	66	37	71	28
New Orleans.....	62	95	60	37	68	18
Simmesport.....		87	69	39	70	41
Melville.....	45	98	81	48	81	37

Warnings issued in March and April have been discussed in flood warning reports for those months.

There were two distinct floods. The first flood crested generally during the latter part of April. The following warning was distributed to all interests, May 3, 1920:

"The Mississippi River below Vicksburg and the Atchafalaya will change very little or fall slowly until between May 8 and 12, when another rise will set in. Water now in sight indicates between 50.5 and 51.5 at Natchez, May 20 to 24; between 39.2 and 40.2 at Baton Rouge, 35.0 to 36.0 at Plaquemine, 30.5 to 31.5 at Donaldsonville, and 18.7 to 19.6 (depending on the winds) at New Orleans, 43.8 to 44.8 at Simmesport, and 40.6 to 41.6 at Melville, May 25 to 28".

The stages changed very little during the first eight days of May, and the following warning was issued May 8:

"The Mississippi River below Vicksburg and the Atchafalaya will change very little for a few days, when a rise will set in. Water now

in sight indicates between 51.0 and 52.0 at Natchez, May 20 to 24; between 40.6 and 41.6 at Baton Rouge, 36.4 to 37.2 at Plaquemine, 32.0 to 32.8 at Donaldsonville, 20.0 to 20.6 at New Orleans (depending upon the winds), 46.0 to 46.5 at Simmesport, and 42.5 to 43.0 at Melville, May 25 to 28."

The rivers continued to rise and crest stages occurred as follows, verifying the warnings as to stages and time of occurrence:

Station.	Stage.	Dates of occurrence.
Natchez.....	51.2	May 18. ¹
Baton Rouge.....	41.6	May 22. ¹
Plaquemine.....	37.2	May 22.
Donaldsonville.....	32.6	May 19. ¹
New Orleans.....	20.4	May 17, 18.
Simmesport.....	46.7	May 21. ¹
Melville.....	42.5	May 20. ¹

¹ And other dates.

The warnings caused levees to be strengthened and carefully watched to prevent breaks, and live stock and perishable goods subject to damage were moved to places of safety.

The following advisory flood warning was issued May 24, 1920:

"The Mississippi River below Vicksburg and the Atchafalaya will change very little except there will be a slight fall at Natchez. High water will continue until after the middle of June."

Only two crevasses occurred, both on the Mississippi River below New Orleans. On April 17, 1920, the batture and levee on the right bank below Buras, 50 miles below New Orleans, slid into the river and caused a crevasse which threatened considerable damage. Prompt action on the part of the engineers enabled them to close the break within a week and no great damage resulted.

May 27, 1920, a crevasse occurred in the levee on the left bank of the Mississippi River, 16 miles below New Orleans. The crevasse was closed May 30, and no serious damage resulted.

Back water from the Mississippi River into the Red, Ouachita, and Little Black Rivers caused damaging overflows in Avoyelles, Catahoula, Concordia and Tensas Parishes, La.

Floods prevailed in the Red River below Shreveport from May 29 to June 6; in the Ouachita, flood stages reached in May continued at Monroe until June 12. The Atchafalaya was also in flood at Simmesport and Melville throughout May and until June 24 and 27, respectively. Warnings of these floods were issued in each case as the necessity therefor arose.—*I. M. Gline.*

Estimated loss by flood.

River and district.	Farm buildings, machinery, live stock, etc.	Suspension of business.	Value of warnings.	Tangible property, roads, bridges, etc.	Crops.	
					Matured.	Prospective.
Mississippi: New Orleans.....	\$12,500	\$50,000	\$45,000	\$250	\$51,500	\$460,000
Red: New Orleans.....			25,000			120,000
Total.....	12,500	50,000	70,000	250	51,500	580,000

TABLE I.—Flood stages for the month of June, 1920.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
ATLANTIC DRAINAGE.					
<i>Santee:</i>	<i>Feet.</i> 12	10	10	<i>Feet.</i> 12.0	10
<i>Rimlini, S. C.....</i>					
<i>Saluda:</i>					
<i>Pelzer, S. C.....</i>	7	6	6	8.0	6